

Listing of the Claims

This listing of claims will replace all prior versions, and listings of claims in the application.

1-37. (canceled)

38. (allowed) A mutant *Tma* DNA polymerase having a mutation in the O-helix resulting in said DNA polymerase becoming non-discriminating against dideoxynucleotides, or a fragment of said mutant DNA polymerase said fragment having polymerase activity.

39. (canceled)

40. (allowed) The mutant *Tma* DNA polymerase of claim 38, wherein said O-helix is defined as RXXXKXXXFXXXYX, wherein X is any amino acid.

41. (allowed) The *Tma* polymerase of claim 40, wherein said mutation is a Phe⁷³⁰→Tyr⁷³⁰ substitution.

42. (allowed) A method of synthesizing a double-stranded DNA molecule comprising:

(a) hybridizing a primer to a first DNA molecule; and

(b) incubating said DNA molecule in the presence of one or more deoxy or dideoxyribonucleoside triphosphates and the DNA polymerase of claim 38, under conditions sufficient to synthesize a second DNA molecule complementary to all or a portion of said first DNA molecule.

43. (currently amended) A method of amplifying a double stranded DNA molecule, comprising:

- (a) providing a first and second primer, wherein said first primer is complementary to a sequence at or near the 3'-termini of the first strand of said DNA molecule and said second primer is complementary to a sequence at or near the 3'-termini of the second strand of said DNA molecule;
 - (b) hybridizing said first primer to said first strand and said second primer to said second strand in the presence of ~~[[a]]~~ said DNA polymerase of claim 38, under conditions such that a third DNA molecule complementary to said first strand and a fourth DNA molecule complementary to said second strand are synthesized;
 - (c) denaturing said first and third strand, and said second and fourth strand; and
 - (d) repeating (a) to (c) one or more times.
44. (currently amended) A method of sequencing a DNA molecule, comprising:
- (a) hybridizing a primer to a first DNA molecule;
 - (b) contacting said first DNA molecule ~~of step (a)~~ with deoxyribonucleoside triphosphates, ~~[[a]]~~ said DNA polymerase of claim 38, and a terminator nucleotide to form a mixture;
 - (c) incubating the mixture ~~of step (b)~~ under conditions sufficient to synthesize a random population of DNA molecules complementary to said first DNA molecule, wherein said synthesized DNA molecules are shorter in length than said first DNA molecule and wherein said synthesized DNA molecules comprise a terminator nucleotide at their 3' termini; and
 - (d) separating said synthesized DNA molecules by size so that at least a part of the nucleotide sequence of said first DNA molecule can be determined.